

CLAIMS

What is claimed is:

1. A hybrid/electric vehicle, comprising:
 - a chargeable battery system;
 - an inverter coupled to the battery system; and
 - an electric AC motor coupled to the inverter, the motor having first, second and third stator windings corresponding to the first, second and third phases of the motor, wherein the inverter comprises:
 - a first leg connected to a first selected one of the first and second leads of the first, second, and third stator windings;
 - a second leg connected to a second selected one of the first and second leads of the first, second, and third stator windings;
 - a third leg connected to a third selected one of the first and second leads of the first, second, and third stator windings;
 - a fourth leg connected to a fourth selected one of the first and second leads of the first, second, and third stator windings;
 - a fifth leg connected to a fifth selected one of the first and second leads of the first, second, and third stator windings; and
 - a sixth leg connected to a sixth selected one of the first and second leads of the first, second, and third stator windings.

2. The hybrid/electric vehicle of claim 1 wherein each of the inverter legs comprises first and second switches.

3. The hybrid/electric vehicle of claim 1 wherein the inverter includes first and second inverter subunits each including three of the legs.

4. The hybrid/electric vehicle of claim 3 wherein the first inverter subunit comprises the first, second and third legs and the second inverter subunit comprises the fourth, fifth and six legs, and wherein the first leg, the second leg, and the third legs are connected to the first leads of the first, second and third windings, respectively, and the fourth, fifth and sixth legs are connected to the second leads of the first, second and third windings, respectively.

5. The hybrid/electric vehicle of claim 3 wherein the battery system comprising a first DC link connect to first inverter subunit and a second DC links to the second inverted subunit.

6. The hybrid/electric vehicle of claim 5 wherein the first and second DC links are interconnected.

7. The hybrid/electric vehicle of claim 1, wherein the inverter comprises first, second and third single-phase inverter subunits.

8. The hybrid/electric vehicle of claim 7 wherein the first inverter subunit comprises the first and second legs, the second inverter subunit comprises the third and fourth legs, and the third inverter subunit comprises the fifth and sixth legs, and wherein the first and second legs are connected to the first and second leads of the first stator winding, respectively, the third and fourth legs are connected to the first and second leads of the second stator winding, respectively, and the fifth and sixth legs are connected to the first and second leads of the third stator winding, respectively.

9. The hybrid/electric vehicle of claim 1 wherein the first and second legs are connected to the first and second leads of the first stator winding, respectively, the third and fourth legs are connected to the first and second leads of the second stator winding, respectively, and the fifth and sixth legs are connected to the first and second leads of the third stator winding, respectively.

10. The hybrid/electric vehicle of claim 1 wherein the motor is an interior permanent magnet motor.

11. The hybrid/electric vehicle of claim 1 wherein the motor is an induction motor.

12. A hybrid/electric vehicle comprising:
 - a battery system that is connected to a DC charger;
 - an inverter coupled to the battery system; and
 - an electric AC motor coupled to the inverter, the motor having first, second and third stator windings corresponding to first, second and third phases of the motor, each stator winding having first and second leads, and wherein the inverter comprises a plurality of switches, the switches connected to provide current to the stator windings at the first and second leads.
13. The hybrid/electric vehicle of claim 12 wherein the motor is an induction machine.
13. The hybrid/electric vehicle of claim 12 wherein the three-phase machine is an internal permanent magnet machine.
14. The hybrid/electric vehicle of claim 12, further comprising at least twelve switches.
15. The hybrid/electric vehicle of claim 12 wherein the plurality of switches are grouped into two inverter subunits defining a cascaded inverter.
16. The hybrid/electric vehicle of claim 15 wherein each inverter subunit comprises three pairs of switches.

17. The hybrid/electric vehicle of claim 12 wherein the plurality of switches are grouped into three inverter subunits, each inverter subunit comprising four switches.

18. The hybrid/electric vehicle of claim 17 wherein each inverter subunit is connected to the first and second leads of a respective stator winding.

19. A method for supplying three-phase electric power to a three phase electric motor for a vehicle, the electric motor having three windings, each winding having first and second leads, the method comprising:

providing an inverter having a plurality of switches; and

connecting each of the first and second leads of each winding to a separate pair of switches.